# Study of Five Newly Discovered Eclipsing Binary Stars

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Binary stars dominate in the Galaxy, yet their actual percentage is unknown. Thus their identification, verification, and description are important. The goal of my project was to determine the main photometric and physical parameters of five newly discovered variables, which during this study were identified as short-period eclipsing binaries. My study is based on 2 sets of CCD observations conducted in 2011 and 2012 by N. Virnina (Tzec Maun observatory, AP-180, unfiltered) and T. Krajci (AAVSO observatory, K-28, i' and r' filters) respectively. Currently I conduct new observations at Lisnyky observatory near Kyiv (700 mm; VRI filters). I evaluated parameters of variables following a standard approach to photometric measurements: I used Lafler-Kinman method to determine orbital periods, Kwee-van Woerden and polynomial approximation methods to measure extreme magnitudes of phase curves. I used Wilson-Devinney code to compute models of binaries and to determine their physical parameters. Modeling yielded inclinations of the orbits, mass ratios, temperatures and configurations of components. One system was identified as detached with significant temperature difference and classified as EA-type. The remaining four stars appeared to be in physical contact and were classified as EW-type. I also discovered that 3 of them reveal instability of their phase curves (variable O'Connell effect), presumably caused by sporadic appearance of spots in their photospheres, which indicates strong magnetic activity. My study showed that instability of the phase curves of close binary systems, and thus activity in these stars, is much more common phenomenon than was generally assumed.

**Awards Won:**